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MEMOIRS  
OF THE  
GEOLOGICAL SURVEY  
OF  
THE UNITED KINGDOM.

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*Figures and Descriptions*

ILLUSTRATIVE OF  
BRITISH ORGANIC REMAINS.

—  
DECADE III.  
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## NOTICE.

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PALÆONTOLOGICAL researches forming so essential a part of geological investigations, such as those now in progress by the Geological Survey of the United Kingdom, the accompanying plates and descriptions of British Fossils have been prepared as part of the Geological Memoirs. They constitute a needful portion of the publications of the Geological Survey, and are taken from specimens in the public collections, or lent to the Survey by those anxious to advance this branch of the public service.

The plan proposed to be followed in the work, of which this Decade forms a part, is as follows :—

To figure in elaborate detail, as completely as possible, a selection of fossils, illustrative of the genera and more remarkable species of all classes of animals and plants the remains of which are contained in British rocks ; to select especially such as require an amount of illustration which, to be carried out by private enterprise, would require a large outlay of money, with little prospect of a return, and a long time to accomplish, but which, by means of the staff and appliances necessarily employed on the Geological Survey, can be effected at small cost, and with a rapidity demanded by the publication of the Maps and Memoirs of the Survey ; thus, it is hoped, affording an aid to those engaged in the sciences with which this work is connected, that they might not otherwise have possessed, and which may materially promote the progress of individual research.

H. T. DE LA BECHE,  
*Director-General.*

*Geological Survey Office, Jermyn Street,  
30th June, 1850.*

## BRITISH FOSSILS.

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### DECADE THE THIRD.

THE third Decade of representations of British Fossils follows up the subject of the first, and continues the series of illustrations of the genera and species of extinct Echinodermata, especially those belonging to the orders *Asteriadae* and *Echinidae*.

The genera illustrated in this Decade are partly new, partly long-established ; so also with the species, some of the most remarkable of unpublished forms having been selected, as well as some of the commonest and best known fossils. Yet, even respecting those which are so familiar that their whole history is believed to have been long ago made out, there is so much to be cleared up, so many points of structure hitherto very imperfectly or not at all elucidated, and such an accumulation of synonyms, that their investigation is much more laborious, and occupies much longer time, than inquiries into entirely new types. Thus, three of the fossils figured and described in this Decade, *Hemicidaris intermedia*, *Galerites albogalerus*, and *Micraster cor-anguinum*, are so familiar to geologists and naturalists, so abundant and so well preserved, that authors do not hesitate to cite them without comment, as if they were free from any obscurity. Nevertheless, I may say confidently, that not until now has the literature of these well-known and often-described forms been cleared up, and many of the most important points in their organization made known. Common as they are, no representations of them, presenting sufficient details of their structure, have ever appeared before.

Among the new forms now first described and figured, some are of singular interest. Two of them, the *Lepidaster Grayii* and the *Tropidaster pectinatus*, are not only new as species, but unquestionably possess features entitling them to become the types of new genera. Of those

belonging to old genera, the *Uraster Gaveyi* is singularly interesting, presenting, as it does, the spectacle of a Liassic echinoderm, which so closely resembles the commonest star-fish now living in the British seas, that it can only be distinguished from it by a minute and critical comparison; and the *Hemicidaris Purbeckensis* is remarkable as being the first member of its tribe ever discovered in strata of the Purbeck series.

The species described and figured have been selected from formations of different geological epochs. From Silurian rocks *Lepidaster Grayii* has been taken; from older secondary strata, the two forms of *Hemicidaris*, the *Galerites (Holectypus) hemisphærica*, chosen on account of its being new to Britain, and also affording an excellent illustration of the sub-genus to which it belongs, and the *Dysaster ringens*, selected for the same reasons; also the new star-fishes, species of *Uraster* and *Tropidaster*, already alluded to. Of cretaceous fossils there are the critical *Galerites castaneus*, and the characteristic *Galerites albogalerus* and *Micraster cor-anguinum*.

A third series of illustrations of the fossil Echinoderms is far advanced, and in preparation for publication.

EDWARD FORBES.

June, 1850.

# BRITISH FOSSILS.

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## DECADE III. PLATE III.

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### TROPIDASTER PECTINATUS.

[Genus TROPIDASTER (new.) FORBES (1850.) (*τροπις*, a keel, and *αστηρ*, a star.) (Sub-kingdom Radiata. Class Echinodermata. Order Asteroidea. Family Asteroidea.) Body stellate, five-rayed [a vent on the dorsal surface?]; rays convex and carinated above, the carina composed of a double series of squamose plates; rest of the dorsal surface spinous, spines simple; ambulacra bordered by transverse plates with spiniferous crests on their anterior margins; ambulacral ossicula rather broad, geniculated, pectinated at their inner extremities. (Suckers biserial.)]

SPECIES UNICA. *Tropidaster pectinatus*.

*Description*.—The general aspect of this star-fish when seen from above is that of a *Uraster*, whilst viewed from below it resembles an *Astropecten*. The rays are rather short, about equal in length to the breadth of the disk, ovato-triangular. The upper surface of the rays and disk is covered with short obtuse simple spines, which, on the sides of the rays, are ranged in oblique rows of about five or six in each row. Placed rather laterally on the disc is seen, though obscurely, a madreporiform plate, and I think I can perceive indications of an anal pore. Down the centre of each ray runs a keel composed of two rows of squamous plates, somewhat quadrate in form, but produced at their anterior and inner angles. This kind of keel, or mid-rib, is not present in any star-fish, recent or fossil, with which I am acquainted, and resembles in form and structure the tiling of the crest of the roof of a house. It must be regarded as a peculiarity of generic value. The rays themselves appear to have been very flexible, and not much liable to injury. Their extremities are rather pointed. On the under surface their centres are occupied by the rather broad lanceolate ambulacral grooves running from the mouth; that orifice is somewhat contracted by the encroachment of the large twin triangular plates with punctated surfaces which occupy the angles formed by the junction of the bases of the rays. The ambulacral ossicula are oblong, rather broad, strongly geniculated in the centre at their anterior margins, and denticulated by about five crenations at the edge which borders the ambulacral sulcus. The margins of the under surfaces of the rays are bordered by transverse, oblong, rather narrow



plates, each bearing a crest at its anterior border indented by the sockets of eight or more rather short cylindrical spines, which have rugose surfaces. It is these crested marginal plates with their rows of spines which give the under surface so much of the aspect of an *Astropecten*.

*Dimensions of the largest Specimens.*

	Inches.
Diameter from apex of one ray to that of the one most distant . . . . .	$1\frac{8}{12}$
Breadth of disk . . . . .	$0\frac{9}{12}$
Breadth of a ray at origin . . . . .	$0\frac{5}{12}$
Length of a ray from angle of junction . . . . .	$0\frac{1}{2}$
Breadth of largest inferior marginal plate . . . . .	$0\frac{2}{12}$
Length of marginal spine, rather more than . . . . .	$0\frac{1}{12}$

*Locality and Geological Position.*—This remarkable star-fish was discovered by Mr. John Gavey, civil engineer, of Chipping Campden, in the LIAS of Mickleton Tunnel, Gloucestershire. Several specimens occurred, and some fine examples, presented by that gentleman, are displayed in the cabinets of the Museum of Practical Geology.

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DESCRIPTION OF THE PLATE.

Fig. 1. Large specimen; ventral surface displayed.

Figs. 2 and 3. Dorsal surfaces of two smaller examples.

Fig. 4. Dorsal surface of a ray and part of disk, showing the keel-plates and their arrangement.

Fig. 5. Ventral surface of a ray and part of disk showing the ambulacra and angle-plates.

Fig. 6. Ambulacral plates and spiniferous plates bordering the ambulacra.

Fig. 7. Margin plates.

Fig. 8. Madreporiform plate.

Fig. 9. A spine.

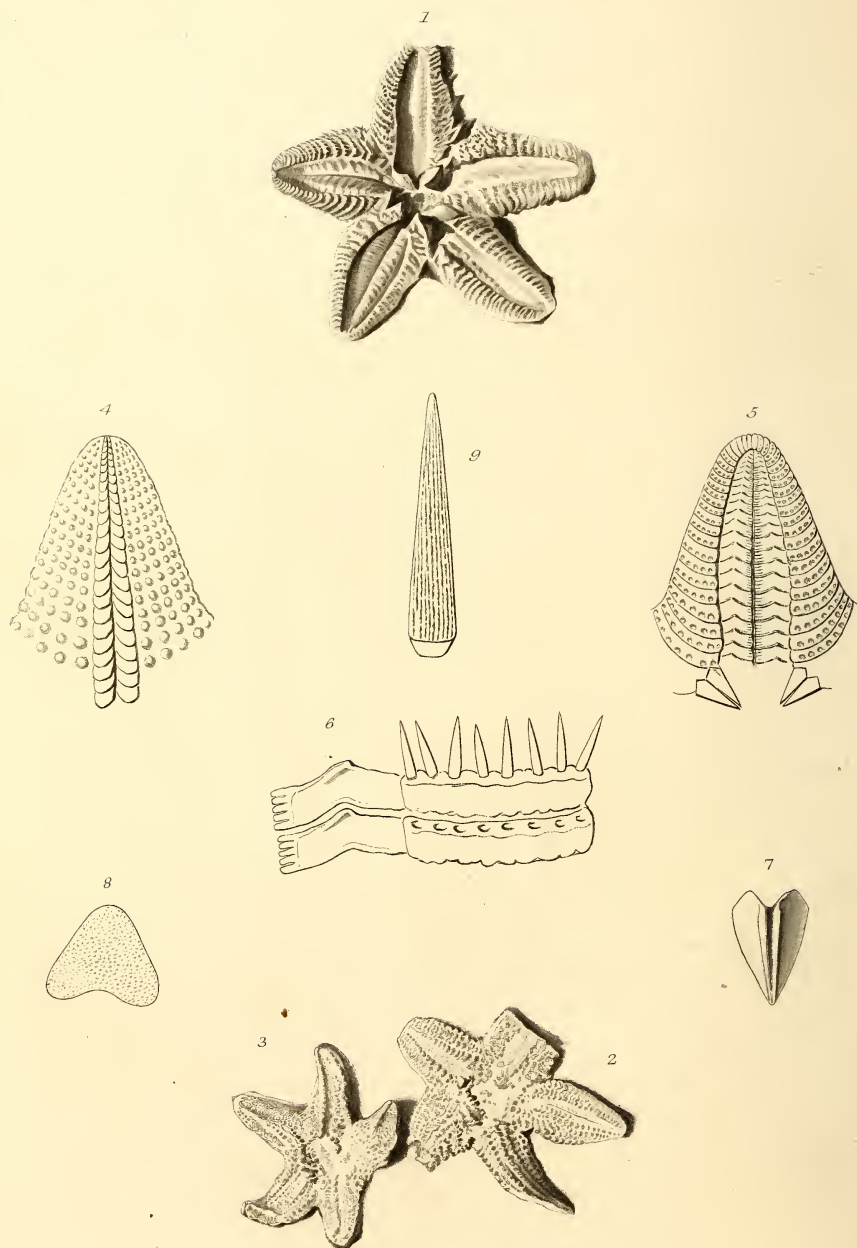
Figs. 4 to 9 are highly magnified.

EDWARD FORBES.

June, 1850.

Geological Survey of the United Kingdom.

TROPIDASTER  
(Oolitic)



TROPIDASTER PECTINATUS — *Forbes*